

## ABSTRACT OF THE INVENTION

A high-diagnostic, dual sensor process temperature switch having a one-out-of-two voting architecture useful in commercial and industrial fluid transport systems is provided for determining whether process connections and isolation valves are plugged or closed, and for determining whether individual temperature sensors within the device are deformed, corroded or otherwise compromised. The dual temperature sensors functionally employ similar electronic technology, and are each disposed to provide variable electrical outputs to one of a plurality of discrete A/D converters. The dual temperature sensors' electrical outputs are compared prior to the A/D conversion process in order to immediately identify large temperature deviations between the respective sensors. Each of the A/D converters' digital signals are routed to one of a plurality of independent CPUs or data processors; the CPUs then generate digital output signals representing either a logical 0 (Low) or 1 (High). Each of the digital output signals are routed to one of a plurality of independent output circuits, each of which either opens or closes an associated output switch responsive to the CPUs' logically evaluated output signals. Each of the plurality of output switches is connected in series with the output switches of the other output circuit(s), and the output signals are voted across the series in a one-out-of-two architecture to determine whether the device's temperature switch output circuit will either open or remain closed. In addition to routing their respective output signals to the temperature switch output circuits, the CPUs also transmit the output signals to an integrated diagnostics circuit for detection of "failed safe" conditions, and to close any circuit around an output that is determined to be failed safe.